Claims

1. An implantable endoprosthesis and radiopaque marker system comprising:

an implantable endoprosthesis adapted to be disposed in a body lumen; and

at least one elongate marker having a proximal end, a distal end, a thickness, and at least one radiopaque portion, the radiopaque portion including a radiopaque material wherein the marker is removably attached to at least a portion of the implantable endoprosthesis and is removeable from the endoprosthesis when the endoprosthesis is *in vivo*.

2. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the radiopaque material is at least partially dispersed from the marker over time.

3. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the radiopaque material has a linear attenuation coefficient of from about 10 cm^{-1} at 50 KeV to about 120 cm^{-1} at 50 KeV.

4. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the marker has a thickness of from about 20 microns to about 500 microns and the radiopaque material has at least one element with an atomic number of from about 22 to about 83.

5. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the marker includes an oxide or salt material having at least one element with an atomic number of from about 22 to about 83.

6. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the marker includes a material selected from the group consisting of barium sulfate, bismuth trioxide, iodine, iodide, titanium oxide, zirconium oxide, gold, platinum, silver, tantalum, niobium, stainless steel, and combinations thereof.

7. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the marker is coated or alloyed with a radiopaque material that has a linear attenuation coefficient of from about 10 cm^{-1} at 50 KeV to about 120 cm^{-1} at 50 KeV.

8. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the marker crosses at least one portion of the implantable endoprosthesis.

9. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the marker is in a form selected from the group consisting of wire, mono-filament, multi-filament, ribbon, suture, spring, and combinations thereof.

10. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the marker comprises material selected from the group consisting of metal, polymer, copolymer, ceramic, and combinations thereof.

11. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the marker includes at least one hollow, cavity, or porous portion.

12. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the marker includes at least one hollow, cavity, or porous portion therein adapted to receive the radiopaque material removably attached therein.

13. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the proximal end of the marker is connected to at least one of the implantable endoprosthesis delivery device or a handle.

14. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the proximal end of the marker has a hook, knob, ring, or eyelet attached thereto.

15. The implantable endoprosthesis and radiopaque marker system of claim 1 further comprising a delivery device wherein the implantable endoprosthesis and marker are disposed in the delivery device and adapted for implantation into a body lumen.

16. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the implantable endoprosthesis is selected from the group consisting of stent, stent-graft, graft, filter, occlusive device, and valve.

17. The implantable endoprosthesis and radiopaque marker system of claim 1 wherein the marker system further comprises at least one elongate wire removably attached to the implantable endoprosthesis wherein the marker crosses at least a portion of the implantable endoprosthesis and crosses the at least one elongate wire.

18. An implantable endoprosthesis and radiopaque marker system comprising:

an implantable endoprosthesis adapted to be disposed in a body lumen; and

at least one elongate marker removably attached to the implantable endoprosthesis, the marker having a proximal end, a distal end, a thickness, at least one hollow, cavity, or porous portion, and at least one radiopaque material having a linear attenuation coefficient of from about 10 cm^{-1} at 50 KeV to about 120 cm^{-1} at 50 KeV wherein the radiopaque material is removably attached to at least one of the hollow, cavity, or porous portions.

19. The implantable endoprosthesis and radiopaque marker system of claim 18 wherein the radiopaque portion is at least one of a liquid, solid, powder, gel, wire, mono-filament, multi-filament, pellet, particle, and combinations thereof.

20. A method of marking an implantable endoprosthesis comprising the steps of:

removably-attaching at least one elongate marker having a proximal and distal end to a portion of an implantable endoprosthesis to form an assembly, the marker including at least one radiopaque material having a linear attenuation coefficient of from about 10 cm^{-1} at 50 KeV to about 120 cm^{-1} at 50 KeV;

disposing the assembly in a delivery system;

inserting the delivery system in a body lumen;

deploying the assembly from the delivery system into the body lumen; and

removing at least a portion of marker from the implantable endoprosthesis.

21. The method of marking an implantable endoprosthesis of claim 20 further comprising the step of performing one or more medical procedures using the markers as a surgical guide prior to removing at least a portion of the marker from the endoprosthesis.

22. The method of marking an implantable endoprosthesis of claim 20 wherein the marker includes a radiopaque portion and a secondary portion and the

radiopaque portion is first substantially removed from the implantable endoprosthesis prior to removal of the remaining secondary portion of the marker.

23. The method of marking an implantable endoprosthesis of claim 20 wherein removing the marker from the implantable endoprosthesis is performed by a force controlled from outside the body.

24. The method of marking an implantable endoprosthesis of claim 20 further comprising the steps of removably-attaching at least one wire to at least a portion of the implantable endoprosthesis and crossing the wire or the elongate marker over the other such that one of the marker or the wire requires removal prior to removal of the other from the implantable endoprosthesis.

25. An implantable endoprosthesis and radiopaque marker system comprising:

an implantable endoprosthesis having a tubular and radially expandable structure adapted to be disposed in a body lumen; and

at least one elongate marker removably attached to the implantable endoprosthesis, the marker including a radiopaque material having a linear attenuation coefficient of from about 10 cm^{-1} at 50 KeV to about 120 cm^{-1} at 50 KeV, a proximal end, a distal end, and a thickness wherein the radiopaque material disperses into the body when *in vivo*.

26. The implantable endoprosthesis and radiopaque marker system of claim 25 wherein the implantable endoprosthesis further comprises an axially flexible structure including a plurality of the elongate elements which are interwoven in a braid-like configuration.

27. A temporary radiopaque marker comprising:

an elongate marker having a proximal end, a distal end, an average thickness of from about 20 microns to about 500 microns, and including a radiopaque material having a linear attenuation coefficient of from about 10 cm^{-1} at 50 KeV to about 120 cm^{-1} at 50 KeV wherein the marker is adapted to be removably attached to an implantable endoprosthesis.

28. The temporary radiopaque marker of claim 27 wherein the proximal end further comprises at least one of a hook, knob, or eyelet.

29. In combination, a discrete radiopaque marker and implantable endoprosthesis comprising:

an implantable endoprosthesis having one or more attachment areas and adapted to be disposed in a body lumen; and

one or more elongate markers having a proximal end, a distal end, and one or more portions therebetween, the markers having a thickness of from about 20 microns to about 500 microns and including a radiopaque material having a linear attenuation coefficient of from about 10 cm^{-1} at 50 KeV to about 120 cm^{-1} at 50 KeV, the one or more portions of the marker being deformed and permanently disposed about the one or more attachment areas of the endoprosthesis.

30. The in combination, discrete radiopaque marker and implantable endoprosthesis of claim 29 wherein the markers are deformed by at least one of plastic deformation, elastic deformation, or combinations thereof.

31. The in combination, discrete radiopaque marker and implantable endoprosthesis of claim 29 wherein the marker further includes one of a twist, knot, crimp, weld, and combinations thereof.

32. The in combination, discrete radiopaque marker and implantable endoprosthesis of claim 29 wherein the one or more portions are ductile.

33. The in combination, discrete radiopaque marker and implantable endoprosthesis of claim 29 wherein the marker is a spring.

34. The in combination, discrete radiopaque marker and implantable endoprosthesis of claim 29 wherein the deformation of one or more portions of the marker into an attachment position on the attachment area thereby prevents the marker from releasing from the implantable endoprosthesis.